

# A new *Cyllecoris* from Crete with a tube-like structure associated with female genitalia (Heteroptera, Miridae, Orthotylinae, Orthotylini)<sup>1</sup>

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**Abstract:** *Cyllecoris ernsti* nov.sp. is described from Crete. Photographs of the dorsal habitus, illustrations of some external characters and of genitalia (male and female) are provided. Female genitalia display an asymmetrical vulvar area and, as an extension, a conspicuous sclerotized tube-like structure strongly pigmented, directed towards the right side. The key of the West Palaearctic species of *Cyllecoris* has been modified in order to include *C. ernsti* nov.sp.

**Key words:** Crete, *Cyllecoris*, male and female genitalia, Heteroptera, Miridae, Orthotylinae.

## Introduction

A species of *Cyllecoris* HAHN collected in Crete, initially taken just as an additional new species, was later – after examination of the female genitalia – recognized as an interesting odd species. The presence of a conspicuous sclerotized, strongly pigmented intra-vaginal structure appeared indeed very unusual and enigmatic. In the present paper, we describe and illustrate this new species. A key is provided to facilitate recognition of the species among the West Palaearctic species of *Cyllecoris*.

## The genus *Cyllecoris* HAHN 1834

The genus is characterized by the following characters: Body elongate and narrow, parallel sided. Head short (Fig. 4), hardly wider than the anterior part of the pronotum (Fig. 3). Antennae long. Pronotum widening posteriorly from the middle. Scutellum bicolored, divided into two distinct parts by a transverse furrow. Legs long and slender, tibiae with fine spines.

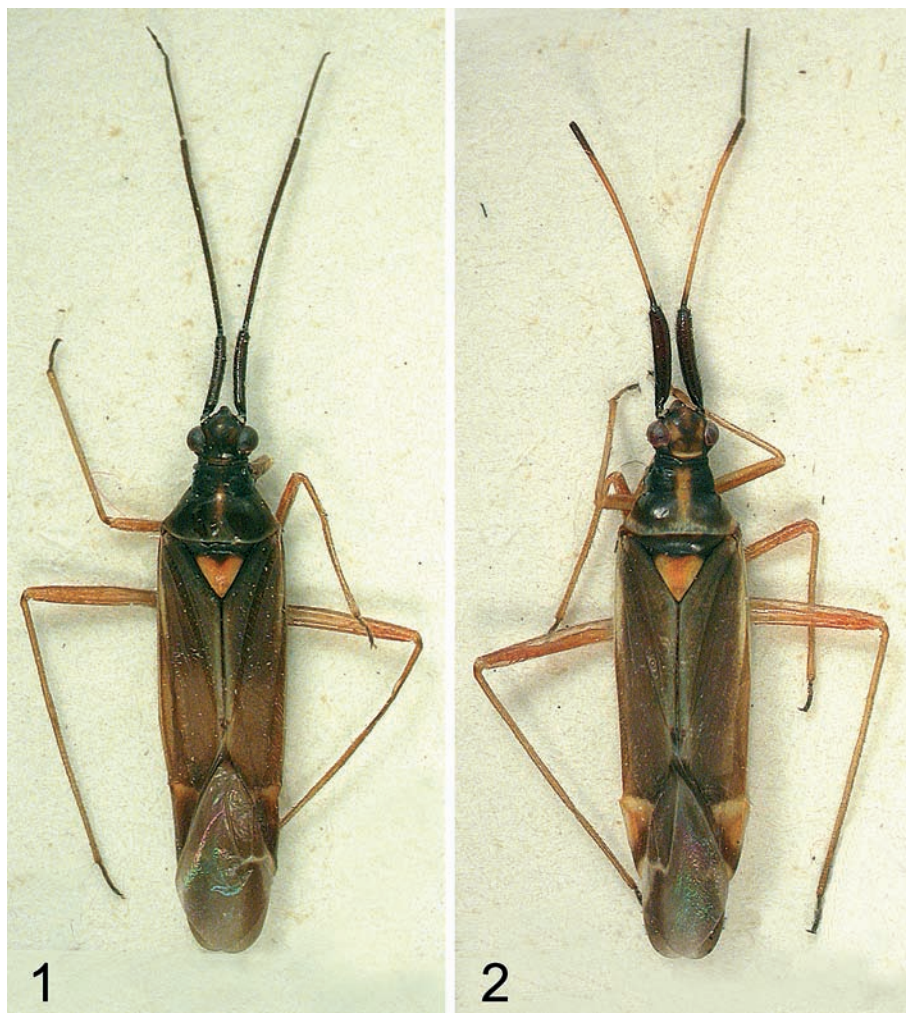
Since the SCHUH (1995) and KERZHNER & JOSIFOV (1999) catalogs, two new species

of *Cyllecoris* from China have been described (LIU & ZHENG 2000); thus, ten species of this Palaearctic genus are known. According to their respective distributions, it appears that two species-groups can be recognized: the West Palaearctic species [*C. histrionius* (L. 1767), *C. marginatus* (FIEBER 1870), *C. merope* LINNAVUORI 1969, *C. djemagati* V.G. PUTSHKOV 1970] and the East Palaearctic species [*C. equestris* STÅL 1858, *C. nakanishii* MIYAMOTO 1969, *C. opacicollis* KERZHNER 1988, *C. vicarius* KERZHNER 1988, *C. badius* LIU & ZHENG 2000, *C. rectus* LIU & ZHENG 2000].

In the key to the West Palaearctic species of the genus proposed by LINNAVUORI (1989), *C. ernsti* nov.sp. can be inserted as follows:

- 1 Base of vertex smooth (Fig. 5) . . . . . 2
- Base of vertex with transverse carina (Figs 6, 7) . . . . . 3
- 2 First antennal segment pale orange. Basal part of pronotum grey . . . *C. histrionius*
- First antennal segment and entire pronotum black, excluding collar *C. djemagati*

<sup>1</sup> We are very pleased to dedicate this paper to our colleague and friend Ernst Heiss on the occasion of his 70<sup>th</sup> birthday.



**Figs 1-2:** *Cyllecoris ernsti* nov.sp., habitus in dorsal view; (1) male; (2) female.

***Cyllecoris ernsti* nov.sp.**  
(Figs 1-4, 6, 8-14)

Holotype: ♂, Crète, (Lasithi) Plateau, 2-VI-1997, A. Matocq leg. (Museum national d'Histoire naturelle, Paris). Paratypes: 2♂♂, 2♀♀, same references as Holotype, A. Matocq leg. (collection A. Matocq, Paris); 1♀, idem (Museum national d'Histoire naturelle, Paris); 2♂♂, Kreta, Tapes (Kritsa), 5-V-1999, K. Liebenow leg. (collection E. Heiss, Innsbruck); 2♂♂, Crete, Hrisopigi Chania, 13-V-1977, sontage on olives, P. Neuenchwander leg. (Museum d'Histoire naturelle de Genève).

**Description:**

**Common characters to both sexes:** Basic coloration smoky brown. Head, pronotum and scutellum glabrous. First antennal segment enlarged (Fig. 6), smooth, shiny, covered with rather dense and fine, erect, pale hairs. Pronotum: calli distinctly rounded, well separated. Scutellum orange. Hemelytra with a relatively dense and clear pilosity, setae long and raised, regularly distributed; membrane smoky brown, with a clear (transparent) triangular area on the external margin, posteriorly to small cell; veins white. Length: 7 mm.

**Male:** All antennal segments dark brown to black (Fig. 8). Cuneus smoky brown with the basal part orange. **Genitalia** (Figs 9-11). Left paramere characteristic for the genus (Fig. 9), with an apical process bent, and a huge perpendicular process strongly pigmented at middle of the body; two main teeth located just below apical process. Right paramere very broad (Fig. 10), roughly rectangular, bearing three small strongly serrated processes, one protruding basally on one side, the other two on the apex of opposite side. The teeth (number, form, development) on both parameres relatively variable from one specimen to another as is the case in other species with toothed or serrated parameres (for example species of *Globiceps*, *Heterocordylus*). Phallus with 5-6 conjunctival sclerotized appendages (Fig. 11), long, slender, sharp, the longer apically serrate.

**Female:** Antennae: first segment black and more strongly enlarged than in male; second segment yellow with the base and the apex darkened; third and fourth segments black. Cuneus widely yellowish or-

- 3 First antennal segment slender, pale orange, with longitudinal black stripe, other segments black (male and female), only lateral margins of pronotum blackish ..... *C. merope*
- First antennal segment incrassate, black; pronotum blackish with pale median stripe ..... 4
- 4 Antennae (in both sexes) yellow; first segment shiny black, incrassate (about as broad as width of eye), the surface being almost glabrous and slightly embossed (Fig. 7) ..... *C. marginatus*
- Antennae (male) entirely black; first segment shiny, incrassate (about half as broad as width of eye) (Fig. 6). Antennae (female) black, except the second segment yellow, darkened toward base and apex; first segment incrassate (about as broad as width of eye) (Fig. 2); surface of the first segment with erect pubescence in both sexes ..... *C. ernsti* nov.sp.

ange, only the apex darkened. **Genitalia** (Figs 12-14). The female genitalia are of the usual orthotyline type described by SLATER (1950): in particular, the infolded ring sclerites on lateral margin (Fig. 13) and the well-developed K-structures (Fig. 12). In dorsal view, an asymmetrical internal structure strongly pigmented and sclerotized (Fig. 13), is clearly visible through the membranous intima of the vagina. It appears as a roughly bent tube-like body, larger at base, projecting first on the right, and curved posteriorly; the apical part (not distinct in dorsal view) is narrower and membranous; it lies just beneath the right ring sclerite and appears free. When examined in ventral view (Fig. 14), the stout tube-like body is anterior to the vulvar area that also is asymmetrical and extremely convoluted.

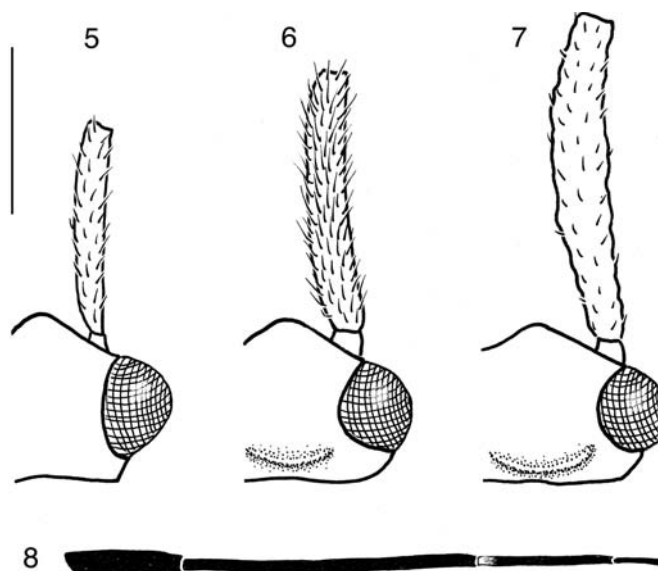
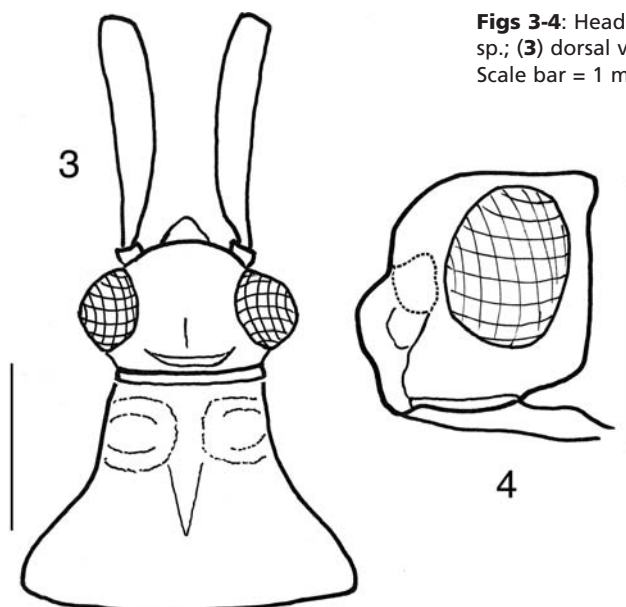
At base of the ovipositor, on each side of the vulva, the two gonapophyses (valvulae) VIII have several large chitinous sheets along their internal margin forming variously expanded irregular lobes; these expansions more or less overlap. The tube-like structure seems to arise from the extension of the left gonapophysis VIII. Most lobes are more or less convoluted. In particular, the wide oval lobe arising from the right gonapophyse forms a deep furrow along part of the internal margin (Fig. 14, arrow).

The tube-like body is hollow, sclerotized, thick-walled; it exhibits apparently a rather complex organization. Although the external features can be easily observed (Fig. 14), morphological details are impossible to see clearly. Depending on the angle viewed, the structure appears as a closed blind tube, or as a tube having an opening along its length.

**Derivatio nominis:** In honour of Prof. Dr. Ernst Heiss in recognition of his contribution to our knowledge of the hemipteran fauna of Crete.

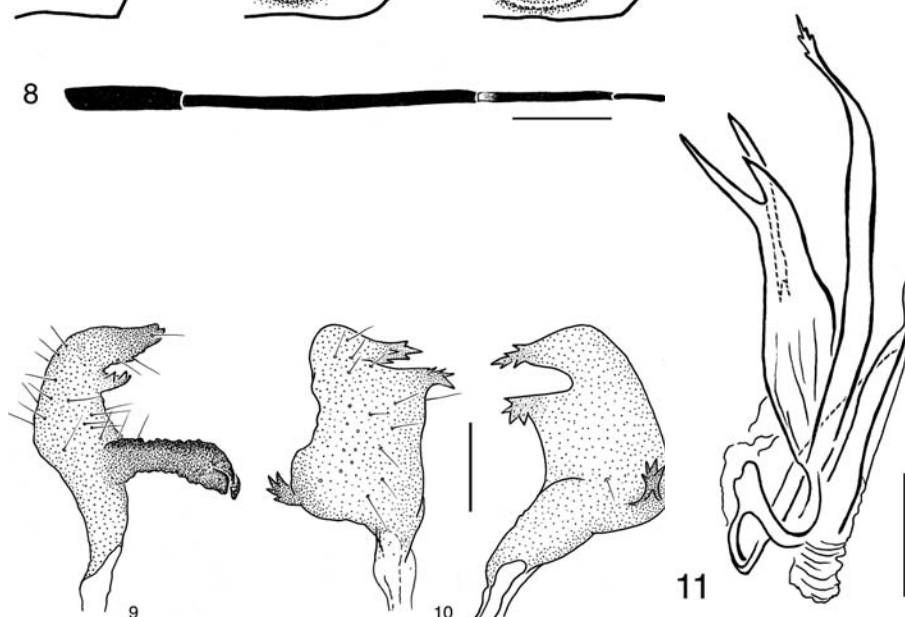
**Host Plants:** Found on *Quercus* sp. as most other species of *Cyllecoris*.

**Figs 3-4:** Head and thorax of *C. ernsti* nov. sp.; (3) dorsal view; (4) head in lateral view. Scale bar = 1 mm.



**Figs 5-7:** Head and first antennal segment in three species of *Cyllecoris* (male); (5) *C. histrionius*; (6) *C. ernsti* nov.sp.; (7) *C. marginatus*. Scale bar = 1 mm.

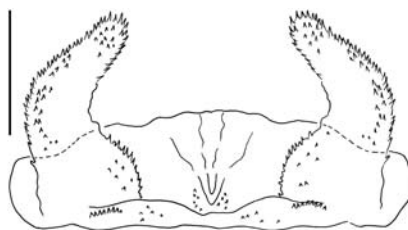
**Fig. 8:** Antenna of *C. ernsti* nov.sp. (male); note the light base of the third segment. Scale bar = 1 mm.



**Figs 9-11:** Male genitalia of *C. ernsti* nov.sp.; (9) left paramere; (10) right paramere in opposite views; (11) conjunctival sclerotized appendages of the phallus. Scale bar = 0.2 mm.



**Fig. 12:** Female genitalia of *C. ernsti* nov.sp., K-structures of the posterior wall. Scale bar = 0.2 mm.

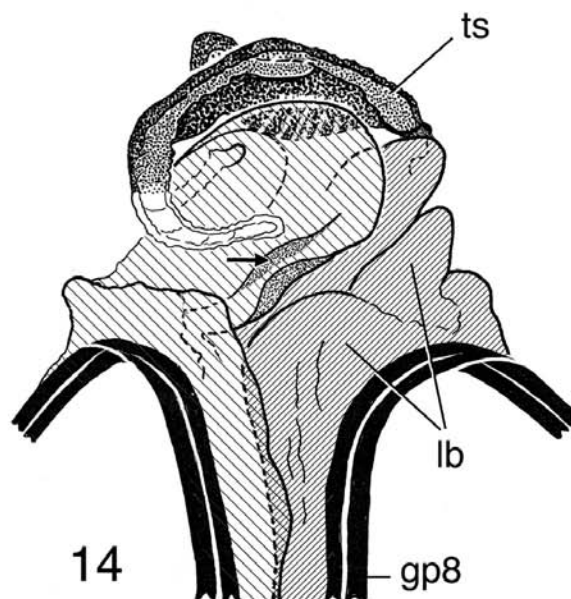
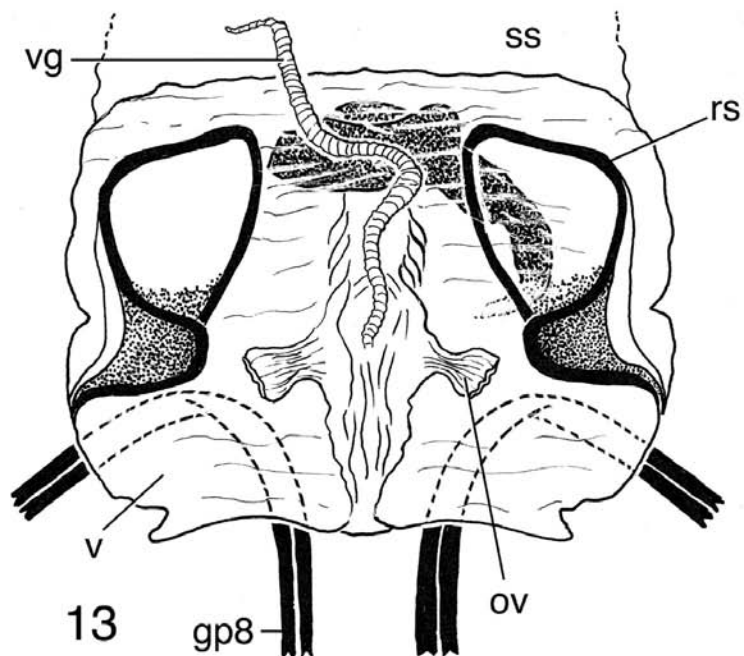


## Discussion

**The distinctive characters:** Among the West Palaearctic species of the genus *Cyllecoris*, *C. ernsti* nov.sp. shares a very distinct carina on the vertex with only two species, *C. marginatus* and *C. merope*. *Cyllecoris merope* can be distinguished immediately from the other two species by the first antennal segment gracile, somewhat orange-coloured. *Cyllecoris ernsti* nov.sp. is similar to *C. marginatus* based on the male genitalia, but it is distinguished by the hemelytral pilosity (in *C. marginatus*, the setae are short, scattered and closely appressed), and the first antennal segment (that of *C. marginatus* being longer, more enlarged, very shiny, the surface embossed, almost glabrous). In addition, the general coloration in *C. ernsti* is smoky brown with an orange-coloured scutellum (in *C. marginatus*, colors are more definite black and yellow; the scutellum is yellow).

**The peculiar tube-like structure in the female genitalia:** With only two available females paratypes examined in a superficial way, the stout sclerotized enigmatic tube-like structure described here in *C. ernsti* nov.sp. is not fully understood and remains difficult to interpret without additional investigations. Dissections of *C. histrionius* show that odd structures also exist in this species, but they are somewhat different and unpigmented and, for that reason, are inconspicuous and more difficult to understand.

Such a structure has not been mentioned for other species of *Cyllecoris*, neither by KULLENBERG (1947) who gave, in his fundamental work on Miridae, a detailed description of the female genital apparatus of *C. histrionius* (asymmetry of the vulva was however observed by him), nor by MIYAMOTO (1969) who has described and illustrated the female genitalia in *C. nakanishii*. From the diagram given by MIYAMOTO (1969), the vagina appears quite distinct and devoid of any unusual structure. Authors who have thoroughly studied the female genital system within Miridae (SLATER 1950; DAVIS 1955), or within some closely related orthotyline genera (SOUTHWOOD 1953: *Orthotylus*), do not mention either structure in



**Figs 13-14:** Female genitalia of *C. ernsti* nov.sp.; (13) vagina in dorsal view showing the tube-like structure below the vermiform gland and the right ring sclerite; (14) vulvar area and tube-like structure in ventral view; note the deep furrow (arrow) on the large lobe issued from the right gonapophysis. Scale bar = 0.5 mm. gp8, gonapophyses 8; lb, lobes arising from the internal margin of gonapophyses 8; ov, lateral oviduct; rs, ring sclerites; ss, seminal sac (seminal depository); ts, tube-like structure; v, vagina; vg, vermiform gland.

the female. However, some remarks about the vulvar area are noted: SLATER (1950) found that diagnostic vulvar characters exist in Orthotylinae; DAVIS (1955) noted in *Lopidea* the presence of an unusual structure described as an asymmetrical sclerotized protuberance ventrally on the vestibulum; and EHANNO (1990) indicated in the Orthotylinae some asymmetrical sclerotized bulges at the bases of the gonapophyses.

In fact, many authors have mentioned or simply illustrated without comments some asymmetrical odd structures in female genitalia of numerous mirid species; see for instance the “lateral tube” described by HENRY & SCHUH (1979) in several phylinae species (*Hambletoniola*, *Beamerella*). After comparison of analogous (or homologous) structures in other mirid genera, these data have been gathered and analyzed (PLUOT-SIGWALT & MATOCQ 2006) in order to help interpret the structure found in *Cyllecoris ernsti* nov.sp.

In the present paper, we stress the complexity of the vulvar area and of the lower area of the vagina in Orthotylinae, already briefly recorded by SLATER (1950). In the case of *C. ernsti* nov.sp., we also notice – either by coincidence or not – similarities (form, size, robustness) between the tube-like structure of the female and the prominent perpendicular process of the left paramere that is strongly pigmented in the male. According to KULLENBERG (1947), the fixation of the female genitalia is carried out by both parameres in *Cyllecoris*. During copulation, the heavily sclerotized tube-like structure could house the prominent process of the paramere functioning thus as an anchoring organ; it could also protect in that way the membranous parts of the female genitalia.

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## Zusammenfassung

*Cyllecoris ernsti* nov.sp. wird neu aus Kreta beschrieben. Der dorsale Habitus, äußere morphologische Merkmale sowie männliche und weibliche Genitalien werden abgebildet. Die weiblichen Genitalien besitzen eine asymmetrische, sklerotisierte, schlauchartige, stark pigmentierte, nach rechts gerichtete Erweiterung. Ein modifizierter Bestimmungsschlüssel der West-Paläarktischen *Cyllecoris*-Arten inklusive *C. ernsti* nov.sp. wird präsentiert.

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